
**Information technology — Database
languages — SQL Technical Reports —**
Part 2:
**SQL Support for Time-Related
Information**

*Technologies de l'information — Langages de base de données — SQL
rapports techniques —*

Partie 2: Soutien SQL d'information d'horodatage



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2015, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents	Page
Foreword.....	v
Introduction.....	vi
1 Scope.....	1
2 Normative references.....	3
2.1 ISO and IEC standards.....	3
3 Time-related datatypes, constructs, operators, and predicates.....	5
3.1 Datetime types.....	5
3.2 DateTime literals.....	7
3.3 Interval types.....	7
3.4 Interval literals.....	9
3.5 Periods.....	9
3.6 Operations involving datetimes and intervals.....	10
3.7 Time-related predicates.....	11
3.7.1 Overlaps Predicate.....	11
3.7.2 Period Predicates.....	11
4 Time-related Tables.....	15
4.1 Application-time period tables.....	15
4.1.1 Extensions to primary key / unique constraints.....	15
4.1.2 Extensions to referential constraints.....	16
4.1.3 Inserting rows of tables containing an application-time period definition.....	19
4.1.4 Updating rows of tables containing an application-time period definition.....	19
4.1.5 Updating the table between specific points in time.....	20
4.1.6 Deleting rows from tables containing an application-time period definition.....	23
4.1.7 Deleting rows between specific points in time.....	23
4.1.8 Querying tables containing a period definition.....	25
4.1.9 Adding a period definition to a table.....	26
4.2 System-versioned tables.....	27
4.2.1 Primary key and referential constraints.....	29
4.2.2 Updating system-versioned tables.....	29
4.2.3 Deleting system-versioned tables.....	30
4.2.4 Querying system-versioned tables.....	31
4.3 Bitemporal tables.....	32
Index.....	35

Tables

Table	Page
1 Fields in datetime values.	5
2 Mapping of Datetime fields to Datetime Datatypes.	6
3 Examples of the datetime datatypes.	6
4 Examples of datetime literals.	7
5 Fields in year-month INTERVAL values.	8
6 Fields in day-time INTERVAL values.	8
7 Fields in day-time INTERVAL values.	8
8 Examples of the interval literals.	9
9 Valid operators involving datetimes and intervals.	10
10 Example data table emp for primary key with application-time period.	15
11 Example data table dept for foreign key with application-time period.	17
12 Example data table emp for foreign key with application-time period.	17
13 Content of table emp after insert with application-time period.	19
14 Content of table emp before updating a row.	19
15 Content of table emp after updating a row.	20
16 Content of table emp with application-time period before updating a row.	20
17 Content of table emp with application-time period after updating a row.	20
18 Content of table emp with application-time period before updating a row.	21
19 Content of table emp with application-time period after updating a row.	21
20 Content of table emp with application-time period before updating a row.	22
21 Content of table emp with application-time period after updating a row.	22
22 Content of table emp with application-time period before updating a row.	22
23 Content of table emp with application-time period after updating a row.	22
24 Content of table emp with application-time period before deleting a row.	24
25 Content of table emp with application-time period after deleting a row.	24
26 Content of table emp with application-time period before deleting a row.	24
27 Content of table emp with application-time period before deleting a row.	25
28 Content of table emp with application-time period after deleting a row.	25
29 Content of system-versioned table emp before updating a row.	29
30 Content of system-versioned table emp after updating a row.	30
31 Content of system-versioned table emp before deleting a row.	30
32 Content of system-versioned table emp after deleting a row.	30

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

In exceptional circumstances, when the joint technical committee has collected data of a different kind from that which is normally published as an International Standard (“state of the art”, for example), it may decide to publish a Technical Report. A Technical Report is entirely informative in nature and shall be subject to review every five years in the same manner as an International Standard.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC TR 19075-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

ISO/IEC TR 19075 consists of the following parts, under the general title *Information technology — Database languages — SQL Technical Reports*:

- Part 1: XQuery Regular Expression Support in SQL
- Part 2: SQL Support for Time-Related Information
- Part 3: SQL Embedded in Programs Using the Java™ Programming Language
- Part 4: SQL With Routines and Types Using the Java™ Programming Language
- Part 5: Row Pattern Recognition in SQL

NOTE 1 — The individual parts of multi-part technical report are not necessarily published together. New editions of one or more parts may be published without publication of new editions of other parts.

Introduction

The organization of this part of ISO/IEC 19075 is as follows:

- 1) **Clause 1, “Scope”**, specifies the scope of this part of ISO/IEC 19075.
- 2) **Clause 2, “Normative references”**, identifies additional standards that, through reference in this part of ISO/IEC 19075, constitute provisions of this part of ISO/IEC 19075.
- 3) **Clause 3, “Time-related datatypes, constructs, operators, and predicates”**, explains time-related datatypes, operators, and predicates in SQL.
- 4) **Clause 4, “Time-related Tables”**, explains how time-related tables are used.

Information technology — Database languages — SQL Technical Reports —**Part 2:****SQL Support for Time-Related Information****1 Scope**

This Technical Report describes the support in SQL for time-related information.

This Technical Report discusses the following features of the SQL language:

- Time-related datatypes
- Operations on time-related data
- Time-related Predicates
- Application-time period tables
- System-versioned tables
- Bitemporal tables

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

2.1 ISO and IEC standards

[ISO9075-2] ISO/IEC 9075-2:2011, *Information technology — Database languages — SQL — Part 2: Foundation (SQL/Foundation)*.